



STANDING COUNCIL
ON TRANSPORT AND INFRASTRUCTURE

Policy Framework for Intelligent Transport Systems in Australia



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ISBN 978-1-921769-60-3

March 2012 / INFRA1250

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Standing Council on Transport and Infrastructure

The Standing Council on Transport and Infrastructure (SCOTI) was established in September 2011 and brings together Commonwealth, State, Territory and New Zealand Ministers with responsibility for transport and Infrastructure issues, and the Australian Local Government Association.

The Council's objective is to achieve a co-ordinated and integrated national transport and infrastructure system that is efficient, safe, sustainable, accessible and competitive. Achieving this objective will support and enhance Australia's economic development and social and environmental well-being.

National cooperation through the Council will seek to maximise the contribution of effective transport and infrastructure to Australia's productivity, quality of life and equity. The Council will undertake critical reforms for Australia that will drive future prosperity.

Improved transport and infrastructure across Australia will help to create a more liveable Australia, with transport and infrastructure integrated into urban and regional planning to foster an inclusive Australia.



Background

The emergence of intelligent transport systems (ITS) for use in land transport networks and the vehicles that use them has potential to deliver significant safety, environmental and efficiency benefits to Australian transport users. Having considered this potential, Australian Transport Ministers agreed to develop a policy framework to build ITS into a shared vision of safe, sustainable, efficient, reliable and integrated transport¹. This framework was endorsed by the Standing Council on Transport and Infrastructure at its inaugural meeting on 4 November 2011.

What are ITS?

ITS encompass the application of information and communications technologies to transport. ITS include stand-alone infrastructure applications such as traffic management systems, as well as cooperative ITS (C-ITS) applications involving telematics, vehicle-infrastructure and vehicle-vehicle communications. These technologies cover private and public transport by road, rail, water and air, as well as cycling and walking, together with applications for cross modal transport and transport hubs.

The focus of this policy framework is on ITS as they are applied to road transport and to interactions between road transport and other transport modes.

¹ Development of the policy framework was initiated by the Australian Transport Council (ATC) in late 2010. ITS were identified in ATC's 2009 endorsed *Australian Strategic Transportation Agenda for Research and Technology (ASTART)*, which included seven policy development research themes with technology as an enabler.

The Need for a Policy Framework

ITS have the potential to contribute to addressing a number of significant challenges for Australia's transport networks that are emerging, and are expected to grow stronger over the medium-term. These include:

- the expected growth in the freight task, with road freight alone projected to increase by 80 per cent by 2030;
- road crashes cost the nation in the order of \$27b a year;
- road traffic congestion will cost the nation in the order of \$20b a year by 2020. Delays result in lower productivity, cause flow-on delays in supply chains and increase the transaction cost of business;
- managing CO₂ emissions, with road transport accounting for 14 per cent of Australia's total greenhouse emissions;
- driving in stop-start congested traffic increases fuel consumption and greenhouse gas emissions by around 30 per cent compared with normal driving conditions during the day²;
- delivering national approaches and regulatory reforms that facilitate competition, open access and compatible systems;
- pressures created by the growth of our major cities limiting transport efficiency and flow on productivity benefits to the economy including the mobility requirements and social inclusiveness of our cities;
- increasing complexity in the operational environment in delivering ITS services; and
- increasing barriers to the construction of major new infrastructure to address urban transport issues – for financial, space, planning and environmental reasons.

The development of ITS under this framework cannot be divorced from economic, social and environmental development, including advances in land use planning, urban design and sustainability. Future uses of ITS must promote a transport system that enhances the mobility of people and products and delivers the economic, social and environmental outcomes the community wants. In addition, this policy framework supports the Commonwealth Government's National Digital Economy Strategy goal for 'smart management of our environment and infrastructure'.

The response to these major challenges cannot be limited to traditional measures. Innovative solutions are needed if we are to successfully address them. The Australian Government's National Urban Policy highlights the role that new technologies can play in improving and enhancing safety, efficiency, cost effectiveness and environmental performance of existing infrastructure networks, and reduce the need for costly new investment.

² RACQ (2008), The Effects of Traffic Congestion on Fuel Consumption and Vehicle Emissions, <http://www.racq.com.au> – Results of On-Road Tests.



ITS are being developed and implemented worldwide as key measures to address these challenges. Some ITS – such as electronic tolling and advanced traffic control systems – are already having a substantial impact on safety and efficiency outcomes in Australia and Australia has been doing world-leading work in the area of ITS standards, accreditation, certification and auditing functions for in-vehicle telematics. However in the absence of an agreed national policy framework, there is a significant risk of ITS solutions being implemented in an uncoordinated and potentially inconsistent fashion which will limit the national benefits that can be delivered by the use of ITS.

A number of leading world economies, including Europe, Japan, USA and Korea are developing ITS programs to address issues such as:

- developing an open in-vehicle platform to integrate safety, efficiency and commercial applications at low cost to all vehicle models, not just high end vehicles;
- implementing common data standards to facilitate cross modal information, to enable door to-door journey planning;
- facilitating the development of real time traffic and traveller data including the roles for maintaining critical road attributes required for safety; and
- exploring the use of the 5.9GHz spectrum band and other communication alternatives that will enable new generation co-operative ITS applications.

Australia will be able to leverage much of the investment made by these countries, particularly with regard to in-vehicle applications as 85 per cent of our new vehicles are imported. However, national coordination based on clear principles will be required to ensure that ITS benefits are optimised – ensuring interoperable systems and applications while encouraging implementation of innovative and cost effective ITS applications that are tailored to Australian conditions.

Having an effective policy framework in place will also facilitate the involvement of Australian companies and research organisations in the ITS market. In addition to the Australian businesses already active in the ITS area, many Australian companies have expertise in developing IT solutions and embedded technology products and can respond to the opportunity to contribute to the development of ITS.

Attachment 1 provides a history of government involvement in ITS in Australia, and current international initiatives, while **Attachment 2** provides examples of current and prospective uses of ITS.

Framework Objective

The Australian Transport Ministers' shared vision for Australia's transport future is for a safe, secure, efficient, reliable and integrated national transport system that supports and enhances our nation's economic development and social and environmental well-being.

ITS are making an increasing contribution to the achievement of this vision, and the objective of this framework is to develop a robust policy platform and identify actions required in the short-term for the development and implementation of ITS in Australia that will ensure that this contribution is maximised.

In particular, the framework will:

- guide the consistent implementation, integration and uptake of ITS nationally across all land transport modes;
- promote innovation and competition through interoperable and, where possible, open access and open architecture ITS solutions;
- provide standardisation for important national and interdependent supplier/provider systems;
- provide an umbrella for specific sectoral initiatives, which will continue to be developed consistent with the principles and objectives of this framework; and
- facilitate the efficient and rapid uptake of ITS that meet consumer demands, driven by the perceived usefulness and benefits of the technology.



Policy Principles

To ensure coordinated and effective deployment of ITS, and to ensure there are no undue obstacles to market-driven take up of ITS products and services, governments will implement ITS initiatives and regulate ITS activities in accordance with the following two sets of principles, covering ITS strategies and detailed policies:

1. ITS development and implementation must deliver demonstrable benefits to individuals, the community and business

ITS provide a suite of enabling technologies that permit the delivery of improved safety, productivity, environmental, urban amenity, and security outcomes. ITS planning and implementation will:

- a) be outcomes focused – make a tangible contribution towards solving key transport challenges (e.g. reducing congestion and freight delays lowering emissions, improving energy efficiency, attaining higher levels of safety and security including vulnerable road users);
- b) be consistent with broader transport network objectives;
- c) build on existing infrastructure and networks – where it is cost effective to do so – including the National Broadband Network; and
- d) facilitate competition and consumer-driven outcomes – for establishment and development of innovative ITS applications and services wherever feasible and appropriate.

2. The policy environment in which ITS are developed and implemented must be robust and dynamic

The policy environment for ITS will provide for both regulatory and non-regulatory processes when market interventions are considered necessary.

Non-regulatory approaches will rely on cooperative agreements between jurisdictions and/or business to adopt common standards, policies and guidelines to harmonise state, regional or sector based solutions.

Under a regulatory framework the adoption of specifications, the issuing of mandates for national standards and the selection and deployment of ITS applications and services shall be based upon an evaluation of needs involving all relevant stakeholders, and an assessment of benefits and costs in accordance with best practice regulatory principles. These measures shall:

- a) deliver interoperability – ensure that systems and the underlying business processes have the capacity to exchange data and to share information and knowledge to enable effective ITS service delivery;
- b) be transparent – regulatory decisions will be evidence-based and follow established and explicit principles and rules;
- c) be fit for purpose – including accreditation/certification and or audit requirements;

- 
- d) discourage inappropriate technologies that could restrict future development;
 - e) be proportionate – provide, where appropriate, for different levels of achievable service quality and deployment, taking into account the local, regional, national and international specificities;
 - f) support continuity of services – ensure seamless services when ITS services are deployed. Continuity of services should be ensured at a level adapted to the characteristics of the individual transport networks, and where appropriate, regions with regions and cities with rural areas;
 - g) encourage innovation – ensure that regulation is only introduced when there is a demonstrated need to do so, is closely targeted, and involves the minimum level of intervention required to deliver a regulatory objective;
 - h) support backward compatibility – ensure, where appropriate, the capability for ITS systems to work with existing systems that share a common purpose, without hindering the development of new technologies;
 - i) avoid favouring particular technologies or applications, to the maximum extent feasible;
 - j) facilitate multiple uses – where appropriate and feasible, enable ITS customer equipment to be used for multiple purposes, to reduce cost and maximise customer value;
 - k) promote equality of access – facilitate and encourage access to ITS applications and services for all users who may benefit from them including vulnerable users;
 - l) facilitate inter-modality – take into account the coordination of various modes of transport, where appropriate, when deploying ITS;
 - m) promote consistency with international standards – enabling Australian suppliers to compete in the world market and providing Australia access to global technology and supplier solutions;
 - n) promote consistency across modes and geography so that information is delivered to end users in a familiar way; and
 - o) promote data sharing – to support the delivery of additional ITS solutions that benefit the wider community.

Policy Framework Implementation

The Transport and Infrastructure Senior Officials' Committee (TISOC) and Austroads will lead in implementing the policy framework with TISOC having broad oversight.

Current Key ITS Issues, Actions-in-train and Positions

National ITS Architecture

Issue: Australia does not have a nationally accepted and ratified national ITS 'architecture', that is, a framework within which an ITS system can be built. The agreement and adoption of a national ITS architecture is a pre-condition for the deployment of consistent and interoperable ITS systems throughout Australia and the unlocking of benefits that are potentially able to be derived from intelligent national transport infrastructure. The goal is to ensure interoperability of systems and applications and provide a robust foundation for future developments; it is not about locking in particular platforms or proprietary applications, with consequent effects on competition and innovation.

Consistent with Commonwealth Guidelines³ a National ITS Architecture framework will assist in the delivery of more consistent and cohesive services to citizens and support cost-effective delivery of ITS services by government and industry, by:

- **providing a common language:** provides a common language for sectors involved in the delivery of cross-sector services;
- **enhancing collaboration:** supports the identification of duplicate, re-usable and sharable services;
- **assisting in describing and analysing ITS investments:** provides a basis for the objective review of ITS investment by government and industry; and
- **assisting in transforming Australia (citizen-centric, results-oriented, market-based):** enables more cost-effective and timely delivery of ITS services through a repository of standards, principles and templates that assist in the design and delivery of ITS capability and, in turn, business services to citizens.

Key Actions: A national ITS architecture for Australia, which will apply across all transport modes, is under development under the auspices of Austroads. As a relatively small player in the global ITS space, it will be essential for the Australian architecture to be consistent with global developments.

The national architecture will provide the basis for the development and implementation of interoperable ITS applications. It will provide for the implementation of open platforms that use this architecture, facilitating competition between equipment and service providers.

³ Department of Finance and Deregulation (2009). *Australian Government Architecture Reference Models Version 2.0*. Department of Finance and Deregulation – Australian Government Information Management Office
<http://www.finance.gov.au/e-government/strategy-and-governance/aga-rm/AGA-RM.html>.

The 5.9GHz band

Issue: To achieve the benefits anticipated for cooperative safety and mobility, a communication interface is required that will deliver a high level of integrity with low system latency. Current wireless communication systems are able to deliver some forms of ITS applications but are not adequate for time critical cooperative safety and mobility applications.

The international community is developing technology based on the WiFi 802.11 set of standards. The 5.9GHz band has already been allocated for cooperative safety and mobility applications in Europe, the United States of America and Canada. To achieve consistency and interoperability, Australia also needs to allocate this band for ITS applications. Following preliminary investigations by Austroads into securing a dedicated communication spectrum for ITS, the Australian Communications and Media Authority (ACMA) has initiated community consultation to facilitate this outcome.

Key Actions: Austroads is in the process of developing a licence mechanism for managing the 5.9GHz band for ITS applications. Final decisions will be made through TISOC on the bandwidth manager and ongoing resourcing as needed.

Cooperative ITS Strategy

Issue: To maximise the benefits and penetration of C-ITS, a consistent national approach is required that addresses the complexities involved in deploying C-ITS. In particular, clear direction from governments is needed on the types of messages sent and received by C-ITS systems, and their technical requirements such as data frequency and accuracy. The development of a national ITS architecture and consideration of the management and use of the 5.9GHz band are two specific issues that are being addressed in the context of the broader strategy.

Key Actions: Work underway under the auspices of Austroads to develop a national C-ITS strategy is to be finalised and provided to TISOC. It will be based on a collaborative approach between governments and industry, at both the domestic and international levels (including standards development).

Australia's involvement in ITS standards development

Issue: Australia is a very small player in the international arena when it comes to provision of transport infrastructure and making and buying new vehicles, representing less than 1.5% of the world's new vehicle market and only 0.25% of new vehicles manufacturing. Consequently Australia must look internationally to adopt an appropriate architecture and standards, and if it seeks to influence the development of those standards it must be involved in relevant international forums. Australia does have a presence in a number of key international standards organisations.

Position: Governments will work through Austroads to continue the current cooperative approach amongst Australian transport agencies and strengthen it to form a national engagement strategy on international ITS standards with the aim of ensuring Australia is able to influence the outcome of priority standards setting processes.

Research into ITS

Issue: Australia is a small player in global ITS activity but we have world-class research institutions involved in ITS projects. There is also considerable R&D capability in Australia in the transport sector. However, much of this effort is relatively fragmented and could be more effectively harnessed for the benefit of the nation.

Having a significant ITS research base is an important means of ensuring Australia can influence global ITS developments and also ensures that ITS applications developed internationally can be made to suit Australian markets and regulatory frameworks.

Position: Consistent with ATC's ASTART document (and any update), any research necessary to progress this framework or implement ITS policies should strengthen Australia's research processes in the transport sector and ensure better coordination between relevant existing bodies, such as the TISOC (with its coordination function for both ITS and transport research), Austroads (with its diverse range of projects with ITS elements) and the Cooperative Research Centre for Rail Innovation. The goal in governments conducting research for ITS should be strong partnerships with industry, research organisations and industry representative bodies (e.g. ITS Australia).

Legal implications of ITS

Issue: Legal and liability issues associated with ITS equipment and applications (indicating the responsibility of drivers, government regulators, roads managers, transport system users and manufacturers of ITS applications) will have a substantial bearing on the design and availability of applications. Settling these issues will be a key element of the establishment of regulatory frameworks. Solutions will need to address issues such as who is legally liable if an ITS system fails, resulting in property damage, commercial loss or death? Commonly held assumptions about the degree of control a driver has over a vehicle will be called into question as more sophisticated ITS and C-ITS systems are incorporated into vehicles and roadside infrastructure.

Position: Legal implications of ITS should be taken into account by jurisdictions as a key element of establishing any regulatory frameworks. This should be approached from a national perspective with model national law being implemented collaboratively by each jurisdiction.

Compliance and Enforcement

Issue: ITS systems create the potential for continuous monitoring of characteristics such as speed, location and distance driven. While creating the potential for improved compliance and enforcement of regulatory frameworks, there is also a risk that this capability could deter commercial take-up of ITS applications that could deliver net community benefits. These issues need to be taken into account in the development of regulatory frameworks for ITS.

Position: Compliance and enforcement should be taken into account by jurisdictions in developing any regulatory arrangements for ITS. This should be approached from a national perspective with model national law which each state working collaboratively to implement.

Privacy

Issue: Privacy has long been a central issue in the deployment of ITS. The precise locational capabilities that will increasingly be built into C-ITS systems will raise significant issues about the availability of data from private vehicle operators. This is particularly so where government agencies seek to use data collected for one purpose for another purpose (and, in particular, enforcement activities). Already there is significant evidence that making available compliance data to enforcement agencies can be a significant disincentive to expansion of use of in-vehicle telematics.

Position: Privacy and risk management issues should be addressed at the design stage for ITS projects and security measures should also be considered to prevent modification, misuse or disclosure of private/personal information. The implications of engaging with the technology should be clear and there should be a straightforward method to opt in or out of applications.

Governance

Issue: Work on ITS is underway in a range of commonwealth-state government transport bodies and forums, crossing transport modes and issues. Examples of bodies where ITS is a key priority include:

- previous work within the Standing Committee on Transport (SCOT – now TISOC);
- Safety Standing Sub-committee of SCOT, and in particular the In-Vehicle and At-Roadside Technologies (IVART) Project; and
- Austroads, including its Co-operative Intelligent Transport Systems Sub Committee (C-ITS SC).

A national approach is required for co-operative ITS deployment as the solutions will not recognise state and territory borders. Legacy ITS applications will have to be migrated to more nationally consistent standards and architecture to enable inter-operability (vehicle to infrastructure applications) and consistent service experience. This will require a nationally agreed business model and governance arrangements.

Both previous work by SCOT and C-ITS SC Industry Reference Group have indicated the need for consideration of a more sophisticated model of governance matching the gathering pace of the ITS development for Australia.

Examples of projects currently underway where ITS are playing a substantial role include:

- work on heavy vehicle telematics initiatives being conducted by the National Transport Commission, Transport Certification Australia, Austroads, and state and territory governments;
- the National Railway Level Crossing Strategy 2010–2020; and
- the COAG Road Reform Plan, with ITS expected to play a critical role if there is a decision to move to charging systems for heavy vehicles which more closely match road pricing to road wear.

There has been a history of patchwork solutions across the country giving rise to inconsistent and inefficient delivery of ITS solutions. The national Intelligent Access Program (IAP) initiative is an attempt to address some of these issues in the field of improving access to the roads network, although results in terms of industry take-up have so far been mixed.

Position: Better coordination of the current range of activities is necessary. As ITS applications are key enablers of improved safety, environmental, productivity and security outcomes – rather than ends in themselves – TISOC and Austroads bodies will establish co-ordination mechanisms that are appropriate to support the cross-modal, diverse nature of ITS with strong partnerships with industry, including through ITS Australia.

Summary of Operational Issues for ITS

Attachment 3 provides a summary of key operational issues, identified in consultancy work conducted for Austroads in 2010. Means to address these operational issues underpin the measures identified in this policy framework by the Commonwealth, states and territories.



Priority Action Areas

Priority action areas over which TISOC will have broad oversight are shown with the responsibilities and projected timelines assigned in the following tables.

Foundational actions

Issue	Action required	Responsibility for progressing	Timing
Network Architecture	Progressing Austroads work to develop specifications for a national ITS architecture. Final decisions to be made TISOC.	Austroads	June/July 2011 – Tenders; Aug 2012 – Stage 1 Final Report
Policy Leadership	All relevant agencies and bodies to be advised of the endorsed national policy framework, and its key elements.	TISOC	Nov 2011
C-ITS Strategy	Work underway under the auspices of Austroads to develop a national C-ITS strategy is to be finalised and provided to TISOC. It will be based on a collaborative approach between governments and industry, at both the domestic and international levels (including standards development).	Austroads	To be endorsed by mid-2012
5.9GHz band	Arrangements for spectrum embargo to be lifted by the Australian Communications and Media Authority. Allocation of ongoing management responsibility and resourcing.	Austroads	Mid 2012

Further actions being pursued under the policy framework

Issue	Action required	Responsibility for progressing	Timing
Government-Industry Linkages	Governments to work with ITS-Australia (ITSA) to build on the principles contained within ITSA's National ITS Strategy (as updated) in a manner consistent with this ITS policy framework.	Governments and ITSA	ongoing
Innovation	Monitor developments in Europe regarding the development of the European Commission White Paper Roadmap to a Single European Transport Area, incorporating where appropriate policy principles to encourage innovation and/or promote uptake of ITS technologies. Monitor developments in other key regions, particularly United States and Japan.	Governments and Austroads	ongoing
Privacy	Consider implications of the National Privacy Principles for development and implementation of ITS initiatives – in particular, review privacy principles in relation to innovation (and deployment) to ensure the ongoing development of IT tools is mirrored within the areas of protection of privacy and personal data.	Governments and Austroads	September (recurring)
Economic Analysis of Smart Infrastructure	Incorporate results of the economic analysis by BITRE of Smart Infrastructure/ITS, in order to ensure the policy framework is consistent with the goals of government in enhancing asset productivity.	Governments and Austroads	March 2012
Standards Development	Developing a more strategic approach to Australian involvement in international standards development.	Governments and Austroads	April 2012
Managed Motorways	Further development of policy approaches by jurisdictions and Infrastructure Australia. Implementation of Commonwealth's 2011–12 Budget Managed Motorways initiative.	Commonwealth and other jurisdictions	May 2012 – 2014

Issue	Action required	Responsibility for progressing	Timing
Governance	<p>Work with Austroads to consider need for new collaborative governance models to reflect the emerging complexities of managing ITS developments, building on the emerging linkages between the technical and operational functions of Austroads and policy processes such as the those led by the TISOC.</p> <p>Confirm arrangements for handling policy aspects of ITS within new COAG standing council structure.</p>	Governments and Austroads	Late 2012
Research and Development	<p>Encouraging the work of the national ITS researchers' roundtable with objectives to foster and project the 'single voice' for the research community; in conjunction with ITS customers.</p> <p>Initiate development of an integrated ITS research strategy, including consideration of possible projects.</p>	Governments and Austroads in collaboration with ITS Australia who will facilitate the research industry participation	End 2012

Consultation

Implementation of this policy framework will proceed by consultation with relevant stakeholder groups and take account of broader national processes including the national urban policy and current work on the COAG Road Reform Plan. Recognising ITS Australia's long-standing role as a body consisting of industry, government and research bodies that represent Australia's ITS sector both domestically and internationally, ITS Australia will be closely involved in activities to implement and further develop this strategy.



Strategic Context: History of government involvement in ITS in Australia, and Current International Initiatives

ATTACHMENT 1

In April 1998, the Australian Transport Council (ATC) requested Austroads to develop a national strategy for ITS. The Strategy, called 'e-Transport', was commissioned and funded by Austroads and was a cooperative effort by Commonwealth, State and Territory Transport Ministers, in consultation with users and industry, to harness the potential of advanced technologies to improve Australia's transport systems.

On 12 November 1999 ATC Ministers first adopted e-Transport, as a crucial step in ensuring advances in technology were harnessed to improve the safety, efficiency and user-friendliness of Australia's transport services – public and private – and to reduce the impact of congestion and traffic emissions.

Key areas of initiative in e-Transport included a focus on:

- achieving interoperability;
- improved rural road safety and safety for higher risk travel;
- assessment of the greenhouse benefits;
- measures to foster a competitive, high value Australian-based ITS industry; and
- development of proposals for national ITS deployment projects in the priority areas of safety, metropolitan, and regional and rural uses.

Flowing from the e-Transport initiative, the first efforts to provide an architecture for ITS resulted in a National Reference Architecture developed in 1999. It was produced by consultants supervised by the National ITS Architecture Working Group (as an informal body of ITS Australia). The Architecture progressed to the next stage, a logical architecture, and was tested in a survey of stakeholder's views of its pilot implementation. Comments were made that the document was large and complex and noted that formal support from both industry and government would be required to take it forward.

In late 2001, Austroads initiated a feasibility project to investigate the Intelligent Access Project (IAP). The feasibility project was completed at the end of March 2003 with the conclusions and recommendations endorsed by ATC in May 2003. In early 2005, SCOT endorsed the establishment of the 'IAP Certification and Audit Group' (eventually named TCA) and its associated Memorandum of Understanding and Constitution.

The 2002 Review *Moving on intelligent transport systems* by the House of Representatives Standing Committee on Transport and Regional Services proposed that ITS be brought into greater prominence in transport policy and planning with the development of a new, comprehensive policy framework.

In June 2004, ATC Ministers agreed to promote a multi modal approach to the development of a new National ITS strategy and agreed that the SCOT ITS subcommittee should continue its work in this area.



In November 2009, the Australian Government initiated the House of Representatives' Smart Infrastructure Inquiry. Since that time a number of Australian organisations, including ITS Australia and Austroads, have provided significant contributions to help shape the Australian ITS agenda. The National Transport Commission has also continued with its work to implement a Telematics Strategy for the road freight industry.

In 2010, ITS Australia brought together a national ITS researchers' roundtable with objectives to:

- foster and project the 'single voice' for the research community;
- in conjunction with 'ITS customers', construct a national ITS research strategy;
- underpin the ITS Research plan with the National Centre of Excellence in Connected Mobility; and
- demonstrate value and accelerate industry and infrastructure development by articulating and promoting key technology demonstrators and test beds.

In the 2011–12 Budget, the government committed \$61.4 million to a Managed Motorways program over three years to fund smart infrastructure technologies to reduce congestion and improve traffic demand management and the overall efficiency of the transport network in major cities.

Austrroads has recently started a new project to develop a National ITS Architecture with the involvement of state, territory and Commonwealth members. A stakeholder engagement plan is currently being assembled and will include consultation with rails bodies and cross modal providers of ITS technology. As a part of this process, Austrroads, with the assistance of ITS Australia, has commenced a review of international ITS architectures and standards. This is seen as an important step to ensure the development of an appropriate business and technology environment for co-operative ITS applications and move away from proprietary based systems that could limit future interoperability.

Austrroads is developing a strategic plan and roadmap for C-ITS. Austrroads is also working closely with Infrastructure Australia in the development of a national managed motorway program which intends to apply a uniform ITS treatment of motorways across the country to improve their productivity and reliability of service to users.

The Department of Broadband, Communication and the Digital Economy has recently commenced discussions with the states and territories around the possible migration of traffic lights and traffic related infrastructure to the National Broadband Network.

International Initiatives

The pace of planning for emerging ITS technologies is now rapidly accelerating. Decisions on policy agreement for C-ITS in the United States and Europe are imminent, with the proposed implementation of C-ITS technologies in new vehicles by manufacturers expected to commence in around 2016.

In Europe, the eSafety initiative, dating from 2002, has been dedicated to halving the number of road deaths in Europe over the last decade through the development and deployment of eSafety systems. Considerable focus has been given to development of new ITS technologies that will anticipate traffic situations ahead including vehicles communicating with each other to warn users about hazardous situations ahead and other obstacles threatening their safety.

Recent prominence has also been given to the eCall system – the pan-European in-vehicle emergency call – which is already on the market. This ITS technology involves the car sensing a major impact and automatically reporting the car's exact location to the nearest emergency centre. Anyone in the car can also trigger an eCall by simply pushing a button. It has been estimated that the eCall system could save an estimated 2,500 lives every year and provide faster medical care for many thousands more.

Another major European ITS focus has been on tracking freight vehicles and dealing with the shortage of parking space for freight vehicles.

To accelerate the coordinated deployment of road ITS and interfaces, Europe has formulated their ITS Action Plan and framework for deployment Directive 2010/40/EU with the key objectives of interoperability and continuity of services. The Directive includes the formation of a European ITS Committee supported by an ITS Advisory Group composed of high level representatives from relevant ITS service providers, associations of users, transport and facilities operators, manufacturing industry, social partners, professional associations, local authorities and other relevant forums.

The core focus of ITS development in the United States of America (USA) is Connected Vehicle Research initiative of the US Department of Transportation's Research and Innovative Technology Administration (RITA). This initiative, until recently known as IntelliDrive, aims to create interoperable connectivity among vehicles, infrastructure, and passengers' wireless devices to produce safety, mobility, and environmental benefits. IntelliDrive safety applications are designed to increase situational awareness and reduce or eliminate crashes through vehicle-to-vehicle and vehicle-to-infrastructure data transmission that supports driver advisories and warnings, plus vehicle and infrastructure controls.

The USA Department of Transportation is committed to using Dedicated Short Range Communications (DSRC), which delivers real-time information and data to, and between, vehicles in ITS technology, in the IntelliDrive platform. This has the dual objective of achieving new safety benefits, and also creating a platform for innovations with countless commercial applications.

Japan and South Korea are also well advanced in planning and implementation of C-ITS technologies. Notably, the successful trial of the Japan's ITS Spot network (providing travel time and route guidance) has led to plans for nationwide deployment in January through to March 2011. During that period ITS Spot facilities will be completed by stages and brought into service at a total of about 1,600 locations throughout Japan mainly on expressways.



Examples of Current and Prospective Uses of ITS

ATTACHMENT 2

Co-operative ITS

Co-operative ITS (C-ITS), namely Vehicle to Vehicle (V2V) and Vehicle to Infrastructure (V2I) applications hold many potential benefits including, but not limited to safety, traffic and productivity management. Potential benefits of C-ITS include a reduction in the number of crashes as vehicles can sense and communicate what is happening around them; road users have detailed information on travel options and so can make a more informed choice; and network operators have full knowledge of the status of the assets within the road network.

There are a range of applications that fall under the C-ITS banner. These include:

- Blind Spot Warning: issues a warning to a driver who is trying to change lanes when another vehicle is in its blind spot;
- Electronic Emergency Brake Lights: issues a warning to a driver when a vehicle ahead of them (that they cannot see) is braking hard;
- Improved Traffic Management Systems: managing the transportation system with knowledge of real-time location of every vehicle using the system including pre-emption at traffic signals for priority vehicles;
- Access to Information En-route: access to information such as weather en-route; and
- Improved Incident Response: improved response to incidents and traffic flow restoration times.

Managed Motorways

The development of managed motorways in urban areas is a major priority in most state capital cities. This has been driven by growing challenges to maximise efficiency and minimise congestion on existing infrastructure, and addressing increasing financial, space, and environmental constraints involved in building major new road infrastructure.

The operation of the motorway networks in major cities can be improved via the implementation and retrofitting of ITS technologies. Examples of these ITS technologies include loop detectors, motorway ramp signals, and lane use management systems including variable speed limits and variable message signs. Managed motorways technology aims to improve productivity and reduce accidents and vehicle emissions without costly investment and land use impacts. Proposals from a number of state governments for ITS managed motorways are among infrastructure priorities being considered by Infrastructure Australia.



Key challenges that will need to be addressed as this work progresses include:

- designing motorway specifications to avoid ‘technological lock-in’;
 - ITS developments will continue to rapidly evolve, and upgrade of ITS infrastructure should not be limited by motorway contracts
- providing adequately for maintenance of ITS infrastructure; and
- ensuring motorways are 5.9GHz compatible and do not incorporate technology that interferes with Austroad’s proposal for use of that frequency.
 - There will be a need to integrate strategic approaches to managed motorways and co-operative ITS, as C-ITS applications have the potential to deliver functionality (relating to such areas as variable speed limits and lane controls) that would otherwise require specific managed motorway investments.

The Commonwealth Government’s recently announced National Smart Managed Motorways Trial provides \$61.4m for the development of a national smart managed motorways trial to improve congestion, lower urban emissions, and expand the capacity of existing outer city road infrastructure networks.

Provision of Driver Information

Provision of driver information is a form of ITS which, as the name suggests, provides information to the driver – a current example is in-vehicle satellite navigation systems which provide not only driving directions, but can also provide traffic updates. Either can be built into new vehicles as either optional or standard equipment (by Original Equipment Manufacturers (OEMs)), or purchased and installed later, which is a booming part of the aftermarket sector.

Currently, there is a proliferation of in-vehicle devices, from both OEMs and the aftermarket sector, being installed in vehicles, with the most noticeable examples being in freight vehicles and taxis. The issue that is currently under investigation is ensuring that drivers are not overloaded with information and are not distracted by a multitude of devices. Work is currently underway internationally, and especially in Europe, to ensure all devices are integrated through a single Human Machine Interface (HMI).

Australia may have to consider the introduction of rules and legislation which prevents or limits the addition of devices to vehicles and/or ensure all aftermarket applications are integrated into a vehicle’s originally equipped HMI.

Telematics

Telematics is an ITS technology that allows monitoring of a vehicle’s movements, including (depending on the application) attributes such as speed, location, and on-board mass. Telematics is finding increasing commercial uses, leading to more efficient private commercial freight operations. It can also be used as a regulatory tool, for purposes such as road charging and compliance and enforcement. The Intelligent Access Program, administered by Transport Certification Australia, is one of a number of telematics frameworks which use vehicle Global Positioning System (GPS) monitoring to deliver

greater productivity while managing increased wear on the road network. Australia's Transport Ministers recently approved a national strategy to drive the voluntary uptake of in-vehicle telematics in the road freight industry to improve road safety, reduce transport costs and cut emissions.

Electronic Work Diaries

New South Wales is leading an inter-jurisdictional pilot of Electronic Work Diaries (EWD). At present, drivers of fatigue-regulated heavy vehicles are required to record their hours of work and rest in a paper-based work diary to assist authorities manage fatigue. The EWD pilot will examine the feasibility of an approved electronic alternative. The pilot is being conducted from June 2010 to June 2013 and the Stage 1 in-field component commenced in July 2011 with 28 vehicles and 27 drivers. The goal of the pilot is to test and refine the national policy and technical specification for the approval of electronic systems and their use for enforcement and business purposes, while delivering safety, productivity and environmental outcomes.

Rail Management

ITS developments are also proceeding rapidly in the rail industry to achieve the modernisation and harmonisation of safety and operational communications nationally. Anticipated benefits for its train protection controls for both interstate and metropolitan networks are the improved network capacity, operational flexibility, service availability, transit times, safety and system reliability. Controllers will be able to schedule more trains on the same area of track and will also be able to 'fleet trains' heading in the same direction by spacing them behind each other at a safe stopping distance. Developments in this area highlight the need for interoperability with road based ITS technology, particularly at railway crossings.

Rail Crossing Safety

There is considerable work underway between governments on the use of ITS to improve rail level crossing safety. Low cost solutions that augment more traditional treatments for crossings, such as signs, flashing lights and boom gates, are being sought. The use of short-range communications between oncoming trains and vehicles or roadside installations to warn drivers may require integration with other ITS technologies.

The implementation of ITS technologies to drive productivity and efficiency gains and safety improvements needs to be in the context of moves to national approaches that avoid the traditional 'break of gauge' disconnects arising from localised solutions. Without restricting innovation, it is important that common interfaces in such areas as train protection controls and railway crossings are applied and that, through the Standing Council on Transport and Infrastructure, governments support general principles for and facilitate implementation of interoperable technologies by industry.

Road User Charging

The Council of Australian Governments (COAG) Road Reform Plan is currently undertaking a Feasibility Study of reform of heavy vehicle pricing and funding arrangements including work to develop more direct charging of heavy vehicles which better reflect the actual costs of each heavy vehicle's use of the road network. ITS will be a foundation element of any future heavy vehicle charging system that requires real time monitoring of mass distance and/or location of trucks.

Safety

Many in-vehicle ITS technologies are capable of delivering substantial crash reduction and injury prevention benefits. However the costs of these technologies at present mean that for the most part they would not be cost-effective. One possible exception is seatbelt reminder systems, which Austroads has recently observed are estimated to produce net benefits. That said, the costs of manufacture are continually falling and it is only a matter of time before more of these in-vehicle technologies become cost-effective.

In contrast there are a number of roadside ITS technologies that are already known to be cost effective in terms of these safety benefits. These include point-to-point speed enforcement, speed feedback signs, and in specific circumstances variable speed limits, weather alerts and wet weather speed limits. Such technologies are already in various stages of implementation by governments.

The National Road Safety Strategy 2011–2020 identifies the potential uses of ITS as an additional tool in improving road safety. Examples of this include the use of alcohol interlocks, Intelligent Speed Adaptation (ISA), as well as the mandating of lane departure warnings for heavy vehicles and brake assist for light passenger vehicles.

The In-Vehicle and At-Roadside Technologies (IVART) project was established under the auspices of the Australian Transport Council. IVART has the core purpose to manage, develop and regulate the evolving Information and Communication Technology (ICT), transport safety and security applications to facilitate appropriate adoption in Australia within a planned policy and technology framework and a high level business and system architecture. In recognising the potential safety benefits of ITS, IVART commissioned research to undertake a cost benefit analysis of Intelligent Speed Adaptation (ISA) within Australia, the results of which indicated that ISA offers positive benefits in reducing road trauma, especially when targeting specific user groups. Research has also been commissioned into the cost effectiveness of a number of technologies including Anti-lock braking systems for motorcycles, lane departure warning, forward collision avoidance with braking and stability control for heavy vehicles.

In August 2010, the Minister for Innovation, Industry, Science and Research, Senator the Hon Kim Carr, launched the *Automotive Australia 2020* technology roadmap to identify opportunities for the industry in new and emerging technologies. The roadmap specifically identified data and communications as an opportunity area that will be important to many aspects of ITS technology, particularly vehicle to vehicle (V2V) and vehicle to infrastructure (V2I) communication.

Key Operational Issues for ITS

ATTACHMENT 3

In the first half of 2010, Austroads engaged consultants SAHA International to develop a report on the issues and pitfalls on introducing C-ITS into the Australian market, policy challenges, identifying and examining the main policy issues of cross-jurisdictional scope involved with the introduction and roll-out of cooperative C-ITS in Australia.

The paper also identified a number of operational policy issues, which included policy challenges which could impede the identified benefit drivers, and have consequential impacts on the introduction, roll-out and anticipated net benefits from cooperative ITS. The 11 key issues were:

1. **Dynamic and Uncertain Environment:** Technical innovation is rapid and multipronged, and cooperative systems cross traditional boundaries between vehicles and infrastructure. Overseas experience suggests that bringing together stakeholders early in the development process assists in managing uncertainty.
2. **Interoperability:** The ability of applications to communicate and work with each other (interoperability) provides the foundation to gaining maximum, sustained, long-term net benefits. Europe, USA and Japan are investing considerable time and resources in attempting to develop the underpinnings for interoperable cooperative ITS.
3. **Functions, Responsibilities, Liabilities and Governance:** Cooperative ITS services involve a large number of participants, and technical, policy and commercial complexities and risks. Identifying functional responsibilities for effective service delivery is a complex but essential task, and decisions on allocation of responsibilities will need to be agreed.
4. **Privacy and Security:** Cooperative ITS applications generate data that is collected by both private and public agencies, and hence creates a potential issue for privacy and security of personal information. Overseas experience demonstrates that privacy and security are issues that need to be addressed early on.
5. **Human-Machine Interface (HMI):** It is likely that by the time new and imported vehicles with cooperative ITS on-board units are available in Australia that the HMI issues involved with originally-installed equipment will have been addressed. There are greater concerns with retrofitting of multiple applications to existing vehicles.
6. **Digital Mapping and Positioning:** Different types of cooperative ITS application require different levels of accuracy from positioning technologies and on-board digital maps. It is probable that current GPS alone could not deliver the degree of accuracy required for more stringent cooperative systems. However, if used in conjunction with other methods, sufficient accuracy could be attained.
7. **Communications:** The process to secure sufficient bandwidth is already well-progressed in Australia and is expected to follow US and European decisions to allocate the 5.9GHz band. Other issues to address include management of licenses, access rules and potential interference with other uses.

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8. **Aftermarket Applications:** The aftermarket sector will be important in Australia, as originally installed applications will only be available through new and imported vehicles. Retro-fitting of hardware and/or software to the existing fleet could occur well before enabled new vehicles are available in sufficiently large numbers on our road system to be effective.
 9. **Potential for Conflict Between Public and Private Objectives:** There is a risk that advice provided by real-time commercial applications may conflict with the objectives of broader network management. A collaborative approach between government and industry is important so market developments contribute to government objectives, and that government policy is informed by an awareness of market developments.
 10. **Roadworthiness:** Once vehicles with cooperative ITS are on the road, the issues of ongoing maintenance and roadworthiness become important to ensure that applications continue to function effectively. The responsibility for in-service vehicle roadworthiness and registration is a matter for states and territories.
 11. **Consumer Confidence and Market Penetration:** Growth in market penetration needs to be based on successfully meeting the range of challenges to cooperative systems. Key issues are regulation of operators, applications, equipment, software etc to provide confidence to consumers that required standards of performance will be met.

